ABSTRACT OF THE DISCLOSURE

A turbo-charged internal combustion cylinder assembly includes a combustion chamber which may be communicably connected to a compressor via an intake port through an intake manifold and aftercooler so the compressor may provide pre-combustion gases to the combustion chamber when the intake valve is open. An exhaust port communicably connects the combustion chamber to an exhaust manifold. An exhaust valve may open to exhaust post-combustion gases to the exhaust manifold while an intake valve is substantially closed, and the exhaust valve may open to admit post-combustion gases to the combustion chamber while the intake valve is substantially open and an exhaust port pressure in the exhaust port is higher than a combustion chamber pressure in the combustion chamber. A fuel injector may admit fuel to the combustion chamber. A spill valve may control a rate of fuel injection to the combustion chamber, the spill valve having a first position providing a maximum fuel injection rate, a second position providing a substantially zero fuel injection rate, and at least one intermediate position providing an intermediate fuel injection rate between the maximum fuel injection rate and the zero fuel injection rate.